

## IMAGE SENSOR MODULE

### BACKGROUND OF THE INVENTION

#### **Field of the invention**

The invention relates to an image sensor module, and in particular to an  
5 image sensor having reduced volume and positioned easily.

#### **Description of the Related Art**

A general sensor is used to sense signals, which may be optical or audio  
signals. The sensor of the invention is used to receive image signals or optical  
signals. After receiving the image signals, the sensor converts the image signals  
10 into electrical signals, which are then transmitted to a printed circuit board via a  
substrate.

Referring to FIG. 1, a conventional image sensor module includes a lens  
holder 10, a lens barrel 20, and an image sensor 30. The lens holder 10 has an  
upper end face 12, a lower end face 14 and an opening 16 penetrating through the  
15 lens holder 10 from the upper end face 12 to the lower end face 14. An internal  
thread 18 is formed on an inner wall of the opening 16 of the lens holder 10. The  
lens barrel 20 formed with an external thread 22 is inserted from the upper end  
face 12 of the lens holder 10, received within the opening 16, and screwed to the  
internal thread 18 of the lens holder 10. The lens barrel 20 is formed with a  
20 transparent region 24 under which an aspheric lens 26 and an infrared filter 28 are  
arranged in sequence. The image sensor 30 has a first surface 32 and a second  
surface 34 opposite to the first surface 32 on which a transparent layer 36 is

surface 34 opposite to the first surface 32 on which a transparent layer 36 is arranged. The image sensor 30 is bonded to the lower end face 14 of the lens holder 10 through the transparent layer 36. The screwed length between the lens barrel 20 and the lens holder 10 may be adjusted to control the distance from the 5 aspheric lens 26 of the lens barrel 20 to the transparent layer 36 of the image sensor 30.

The above-mentioned image sensor module has the following drawbacks.

1. Because the image sensor 30 is bonded to the lower end face 14 of the lens holder 10 through the transparent layer 36, the image sensor 30 cannot be 10 replaced when the image sensor 30 of the module is damaged. In this case, the overall module has to be treated as waste material, and other good elements in the module may not be recycled.
2. Because the transparent layer 36 is bonded to the lower end face 14 of the lens holder 10 by the adhesive, which may contaminate the surface of the 15 transparent layer 36, poor optical signals may be obtained.
3. When the module is assembled, the transparent layer 36 has to be precisely positioned with the aspheric lens 26 and then bonded to the lens barrel 20. Once the positional precision deviates from the standard level, the overall module cannot be reassembled and has to be treated as waste material
- 20 4. The lens holder 10 has to be additionally provided to combine the lens barrel 20 with the image sensor 30.

## SUMMARY OF THE INVENTION

An object of the present invention is to provide an image sensor module having manufacturing easily.

Another object of the present invention is to provide an image sensor  
5 module having a reduced and miniaturized package volume.

To achieve the above-mentioned objects, the invention provides a first substrate, which have a upper surface and a lower surface, the upper surface is formed with a plurality of first connected ends, the lower surface is formed with a plurality of second connected ends. A photosensitive chip is arranged at the upper  
10 surface of the substrate, and is electrically connected the first connected ends by a plurality of wires. A lens holder is formed with penetrate hole at a central thereof, an internal thread is formed on the inner wall of the penetrate hole, the lens holder is mounted on the upper surface of the first substrate to encapsulate the photosensitive chip. A lens barrel is arranged within the penetrate hole of the lens  
15 holder and is formed with an external thread, which is screwed to the internal thread of the lens holder, the lens barrel is formed with a chamber and an opening communicating the chamber.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view showing a conventional image sensor  
20 module.

FIG.2 is a cross-sectional view showing an image sensor module of the

present invention.

FIG. 3 is an exploded cross-sectional view showing an image sensor module of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

5 Referring to FIG.2, an image sensor module of the present invention includes a substrate 40, a photosensitive chip 42, a lens holder 44, and a lens barrel46.

10 The substrate40 has an upper surface52 and a lower surface54, the upper surface52 is formed with a plurality of first connected ends56, the lower surface54 is formed with a plurality of second connected ends58.

The photosensitive chip42 is arranged at the upper surface52 of the substrate40, and is electrically connected the first connected ends56 of the substrate40 by a plurality of wires60.

15 The lens holder46 is formed with penetrated hole62 at a central thereof, an internal thread64 is formed on the inner wall of the penetrated hole62, the lens holder46 is mounted on the upper surface52 of the first substrate40 to encapsulate the photosensitive chip42.

20 The lens barrel46 is arranged within the penetrate hole62 of the lens holder46 and is formed with an external thread66, which is screwed to the internal thread64 of the lens holder64, the lens barrel46 is formed with a chamber68 and an opening70 communicating the chamber68. An aspheric72 and transparent

layer74 are placed within the chamber68.

Please referring to FIG.3, is an exposed cross-sectional view showing an image sensor module of the present invention. A method of manufacturing the image sensor module includes the steps.

5 Providing a substrate40 has an upper surface52 and a lower surface54, the upper surface52 is formed with a plurality of first connected ends56, the lower surface54 is formed with a plurality of second connected ends58.

Providing a photosensitive chip42 is arranged at the upper surface52 of the substrate40, and is electrically connected the first connected ends56 of the 10 substrate40 by a plurality of wires60.

Providing a lens holder46 is formed with penetrated hole62 at a central thereof, an internal thread64 is formed on the inner wall of the penetrated hole62, the lens holder46 is mounted on the upper surface52 of the first substrate40 to encapsulate the photosensitive chip42.

15 Providing a lens barrel46 is arranged within the penetrate hole62 of the lens holder46 and is formed with an external thread66, which is screwed to the internal thread64 of the lens holder64, the lens barrel46 is formed with a chamber68 and an opening70 communicating the chamber68. An aspheric72 and transparent layer74 are placed within the chamber68.

20 The image sensor module of the invention has the following advantages.

1. Since the lens holder is directly arranged at the substrate , so present invention bay be reduced and miniaturized the package volume.
2. Since the wires 58 are bonded to the upper surface 48 of the substrate 40, the gap between the substrate 40 and the photosensitive chip 44 may be reduced, and the package volume of the image sensor may be effectively miniaturized.

5 While the invention has been described by way of an example and in terms of a preferred embodiment, it is to be understood that the invention is not limited to the disclosed embodiment. To the contrary, it is intended to cover various 10 modifications. Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to encompass all such modifications.